I. The Case for Information Literacy
In the April 17, 2011 issue of the *Wall St. Journal*, the bar graph shown below appeared in the Review & Outlook section, under the headline “Where the tax money is”[1]. The editorial presented an argument as follows: in the ongoing debate about extending the Bush-era tax cuts in the U.S., most of the taxable income resides with the middle income earners (represented by that high bar in the middle), so that is who should be taxed the most. The graph itself is marked “Source: IRS”, implying that either the data or the graph came from a government source.

This article spawned dozens of response articles from media outlets like the Huffington Post [2], The New Republic [3], and Mother Jones [4] on the left, to Powerline [5] and National Review [6] on the right. The total number of Facebook likes, Twitter reposts, blog comments and media responses to the original graph and article currently total well over 100,000.

Many of the responses were sophisticated - using statistical reasoning, economic analysis, and historical references to make a case for or against the data as presented. To craft a persuasive argument in response to this article requires the following:

- the ability to determine that the background information for this argument lies at the intersection of economics, statistics, and public policy; and the ability to locate materials to support or counter the argument;
- the ability to find out whether the data shown is valid and accurate, comes from the sources stated, and is accurately presented;
- the ability to assess and critique the motivations and biases of each article author and the purposes of each argumentation and presentation strategy;
- the ability to understand and critique the graphical/statistical presentation of the data used in a given argument and effectively pose a counter-argument to achieve a purpose;
- the ability to craft an argument (pro, con or other) that uses the information from a given domain accurately, fairly, and ethically.

These are, as it turns out, five examples of the five standards describing competency in *Information Literacy*[7] - a set of skills necessary for meaningful participation in 21st century society.

Our question is as follows: If shown the original graph and article, would any given student from Elon University graduating in May of 2011 (a) recognize that the data and conclusions on both sides of the debate are open for discussion and that their input is critical in forming public policy, and (b) have the Information Literacy skills to craft accurate, convincing, timely, and fair arguments to support a position?
In this proposal, we first give relevant background on the concept and standards of information literacy, and we then present a case for why Elon University should make an unprecedented commitment to ensuring information literacy competencies in our graduates. We then propose a radical plan for infusing information literacy standards into both curricular and co-curricular programs. We conclude by describing the benefits that our plan will bring to Elon University.

II. What is information literacy?
Information literacy is the name for a set of skills needed to find, evaluate, and use information. In a proclamation declaring October 2009 as Information Literacy Awareness Month, President Barack Obama explained why this is a critical challenge for Elon University in the 21st century:

Though we may know how to find the information we need, we must also know how to evaluate it. Over the past decade, we have seen a crisis of authenticity emerge. We now live in a world where anyone can publish an opinion or perspective, whether true or not, and have that opinion amplified within the information marketplace. At the same time, Americans have unprecedented access to the diverse and independent sources of information, as well as institutions such as libraries and universities, that can help separate truth from fiction and signal from noise.

The President is asking universities like Elon to step up to the task of creating an information literate society. He goes on to specifically differentiate this new skill from other types of literacy: “In addition to the basic skills of reading, writing, and arithmetic, it is equally important that our students are given the tools required to take advantage of the information available to them” (emphasis added).

How should Elon proceed? Conveniently, the difficult work of figuring out what information literacy means in higher education has already been done. The American Association of College and Research Libraries (ACRL) has five standards that, when met, indicate that a college student is information literate [7].

Standard 1: The information literate student determines the nature and extent of the information needed.
Standard 2: The information literate student accesses needed information effectively and efficiently.
Standard 3: The information literate student evaluates information and its sources critically and incorporates selected information into his or her knowledge base and value system.
Standard 4: The information literate student individually or as a member of a group, uses information effectively to accomplish a specific purpose.
Standard 5: The information literate student understands many of the economic, legal, and social issues surrounding the use of information and accesses and uses information ethically and legally.

From the ACRL guidelines, each of the five standards has associated performance indicators, 22 in total. Each performance indicator has a number of learning outcomes. The standards, indicators, and outcomes are arranged purposefully to move from lower-order to higher-order thinking. Here is an example relevant to the Wall St. Journal example given earlier.
Standard (3): The information literate student evaluates information and its sources critically.

Performance Indicator (2): The information literate student articulates and applies initial criteria for evaluating the information and its sources.

Outcome (b): Analyzes the structure or logic of supporting arguments or methods.

In examining the graph, the student might question whether the x and y axes are arranged correctly. She may notice that the “bins” arranged on the x-axis of the graph seem to be chosen arbitrarily. She will then attempt to apply Outcome (c): “Recognizes prejudice, deception, or manipulation”. She will then reapply all five Standards: She will locate the original IRS data (available online), and she will create her own plot, with evenly-spaced bins. She will write an explanation of her deviation from the original and state why it is better.

III. Why does Elon University need an information literacy QEP?

The core information literacy competencies are already defined and assessment standards are articulated. The challenge, then will be to impart these standards to Elon University students in a way that meets our needs as stated in our mission statement and strategic plans.

Elon’s mission statement [9] describes four actions that we promise to take as a university that “transforms mind, body, and spirit and encourages freedom of thought and liberty of conscience”. A focus on information literacy compliments each of these: it will nurture our intellectual community, it will provide a dynamic and challenging undergraduate curriculum, it will help students integrate knowledge across the disciplines and put knowledge into practice, and it will foster a passion for a life of learning.

Specifically, in our most recent strategic plan [12], we state that we are going to create a General Education program that is ready “to respond to the 21st century environment, becoming a national beacon for excellence and innovation”. We state that our departments and programs “will be challenged to rise to new levels of academic and scholarly accomplishment”.

We attempted to find some data to show whether Elon students already have the information literacy skills needed to achieve these levels of accomplishment. Are they already able to evaluate sources and assemble good arguments based on evidence? Are they already adept at dealing with mountains of data? There was not much data available on our students’ use of information and their research skills (perhaps this alone is telling) or on faculty expectations for their knowledge in this area, but here is what we found. (Original data is shown in Appendix 1 at the end of this paper.)

The 2010 CIRP data (incoming first year Elon students) indicates that only 40% of students describe themselves in a way that we would consider “information literate” before they get here:

- 100% of incoming first-years use the Internet to do their homework. (Listing 9)
- But 60% of incoming first-years only “occasionally” or “never” evaluate the quality or reliability of information they receive. (Listing 10)

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1For those hoping the mountains might get smaller over time, consider Google’s assertion that humans are currently creating as much new data in two days as was created from the dawn of civilization until 2003 (five exabytes). [10]
The 2010 YFYC data and NSSE data for Elon first-year students can help us determine whether we are making an impact on their information literacy after they get here:

- 35% of first-year students reported “no change” had been made in their ability to conduct research since they arrived on our doorstep (Listing 6) and 10-29% reported “no change” in their critical thinking skills (Listings 3 and 7).
- 100% of students still report using the Internet to do their homework (Listing 8).

Are faculty members as confident in the preparation of the students? Data from Spring 2011 FSSE faculty surveys are not yet available, but we will update this report when we receive this data.

What about how university students are doing nationally? Some of the research in recent publications like *Academically Adrift* [18] suggests that students are learning very little on university campuses (research skills included). The recommendation is that while social forms of engagement are interesting, and universities are doing well in this area (including Elon), universities should look for ways to engage students more academically and more rigorously.

With all this in mind, narrowing the gap between what is and what should be is the goal of this proposal. Our accrediting body (SACS) allows us to create a Quality Enhancement Plan intended to significantly impact student learning at Elon University. It is our contention that this QEP should be: (1) doable, (2) broadly applicable to the student body as a whole, and (3) focused on an area that is important and has synergies with other things we are already doing.

**IV. What should the Elon University information literacy QEP look like?**

Among universities, information literacy QEPs are not uncommon. Models used to integrate information literacy standards into a university [11] typically include any of the following:

1. **General education focus:** Information literacy is integrated into the general education requirements, for example, by creating a new “category” with a menu of courses.
2. **Introductory course focus:** Information literacy is integrated into courses at the “introductory” level: orientation, first-year core, introduction courses in all programs.
3. **First year focus:** Information literacy is introduced in a course for all first year students.
4. **Department/program learning outcomes focus:** Departments and programs will define how they will infuse information literacy into their curricula through learning outcomes.
5. **Faculty focus:** Faculty members are given incentives to integrate information literacy standards on a course-by-course basis.
6. **College-Readiness model:** University partners with secondary schools to teach information literacy skills needed in the first year.
7. **Entrance Requirement model:** Information literacy test required for admission.
8. **Graduation Mastery focus:** Information literacy test required for graduation.
9. **Library On-Demand focus:** University library offers programs to teach research skills and increase information literacy in a just-in-time or on-demand fashion; may be offered to individuals or groups; may be assessed.

We were most intrigued by items 4 and 9, because of the emphasis on learning outcomes, and because we suspect that different academic departments will want to emphasize information
literacy in different ways. We respect these differences and want to allow for as much freedom in both methods and timing as possible.

We did not find any existing information literacy models that had a co-curricular focus. But we were interested in creating “seamless connections among the academic, co-curricular and residential experiences” as described in the Elon Commitment, a goal that may also help refute the charges in [18]. Thus, our plan below may be the first of its kind. The plan outlined here is a combination of a Co-Curricular model, a Department/Program model, and a Library On-Demand model.

**Plank One: The Watch** is a bold co-curricular initiative designed to increase student exposure to information literacy concepts in a dynamic, problem-based way. The Watch would attack the “crisis of authenticity” President Obama spoke of in his proclamation. The easiest way to describe The Watch is that it resembles a research center (with an online public face) made up of one part Politifact, one part FactCheck.org, one part Mythbusters, one part Elon Pendulum, and a dash of Elon Poll. Students, working in teams as paid researchers, will develop a methodology for other students to use in evaluating information resources, and will put that methodology into action by investigating and publicly reporting on timely information-based topics.

The Watch has two parts: (a) information education projects focusing on building information literacy “savvy” such as are found in ACRL Standards 1-3; and (b) special projects focusing on using information to achieve a purpose, such as are found in ACRL Standards 4-5.

**Building Information Savvy**

One of the main goals of The Watch would be to educate other students on how to be skeptical and savvy about information, especially the stuff they find online. To do this, The Watch will do two things: (a) compile guidelines used in assessing validity of information, and (b) investigate intentionally misleading web sites, junk science, suspicious “news” items, ambiguous language used in presenting “facts”, and PR masquerading as news.

1. **The Watch “Guidance Team”** - Students will develop this up-to-date, easy-to-follow, interactive online checklist methodology for anyone to use to determine whether something found on the Internet is bogus or valid. The checklist can include written guidelines, but will focus on interactive tests and tools to help determine the veracity of a piece of information. Special attention will be paid to giving guidance for how students can use and contribute to highly-used (but controversial and confusing) sites such as Wikipedia. This focuses on ACRL standards 1-3.

2. **The Watch “Investigations Team”** - Students on the investigations team will use the methodology developed above to build a large collection of Alarm “cases”, each detailing an example of bogus information found online or in the media. Each case will describe the (dis)information in question, and will explain the investigation using as much detail as possible. Students working on this project can take suggestions of material from other students as cases, they could answer tricky questions or give advice about how to find out whether something is true or false, and they could sponsor guest researchers from around the university to help solve cases. This work focuses on ACRL standards 1-4.
Using Information to Achieve a Purpose: Special Projects

Faculty and staff members wishing to mentor a special projects team can propose a longer-term project of a more comprehensive, investigative nature. Special projects typically will attempt to answer a difficult question that has either the production of information, the display of information, or the validation of information at its core. These projects should explicitly attempt to meet ACRL information literacy Standards 4 and 5. Projects should be intellectually engaging and relevant to the community. Examples might be:

1. Uncovering Food Deserts in Alamance County. Working with mentors, students would investigate the concept of food desert and the maps produced by the USDA [14] showing vast areas in Alamance County with little or no access to fresh foods. Students can study the data, collect and layer additional demographic data, investigate the shift of populations over time, and interview lawmakers and community members to learn more.

2. Visualizing Urban Revitalization. Working with mentors, students would gather photographs of streetscapes (data) and manipulate these images digitally to describe the impact of a re-designed landscape, the addition of trees, narrowing of streets, refaced buildings, etc. Digital images serve as the argument in creating a case for change. (What would I-85 through Alamance County look like without billboard advertising? What will it look like to walk from point A to point B through Burlington using a new sidewalk?)

3. Fact-checking claims made about the North Carolina State Budget. Working with mentors, students would investigate the data and claims used by competing special interests with respect to budgetary shortfalls, raising taxes, cutting expenditure programs and entitlements. Graphs and charts would be examined for accuracy, speeches could be analyzed along the same lines as Politifact.org or Factcheck.org.

4. Combining information from multiple channels in new ways. Working with mentors, students would design novel methods of exploring dense information in a new way, using text, multimedia, graphics, sound, etc. For example, students could distill the facts about an issue in the Elon Common Reading into an interactive web site, summarizing and emphasizing important points, as in [15]. Students could use visual text analysis techniques to create graphical representations of famous speeches, layering visual information on top of audio information to bring new understanding, as in [16].

While The Watch is an audacious and high-profile plan, it will probably not be able to support participation by 5000 students. Therefore it is critical that information literacy standards are woven into the curriculum so that all students can benefit.

Plank Two: Curriculum Infusion. We propose a curriculum development plan that has a department and program focus, with special emphasis on creating partnerships with librarians in Belk Library. We propose to offer large grants to each department or program (hereafter, just “department”) so that the faculty members in that department can work with relevant information specialists (such as those from Belk Library or additional outside consultants) to develop two items: (a) a plan for integrating ACRL information literacy standards into their courses and curriculum, and (b) a way to assess that integration. Each $20k grant will be for a two-year initiative. Our budget and timeline give more information on how this will work.

The plan (and assessment) that each department comes up with under this initiative will vary. This is intentional. Some departments might want to spend the money on training, conference
travel, speakers, or consultants. Others might want to give out stipends to revamp existing courses or to propose new courses that focus on information literacy. At the end of the five-year initiative, each department will have documents detailing how they integrated information literacy into their courses, as well as any assessment results they have gathered up to that point.

The Library is central to this curriculum infusion Plank. We recommend two things:
1. We recommend creating and sustaining dynamic partnerships between librarians and faculty members in planning and evaluating how information literacy will be infused into each department. In this model, sometimes called “Embedded Librarianship”, librarians are integral partners to each teaching faculty member. This partnership enables the librarian to be an effective provider of the most important information for each faculty member and department. It helps the faculty member understand the information literacy and research options available, and how the library can help.
2. We recommend additional assessment of the Library On-Demand teaching for both individuals and classes through either some standardized assessment mechanisms such as [17] or through the development of an in-house assessment tool. This emphasis on assessment could help both the librarians and faculty members understand the type of training the students have, what the students need, and may give ideas for closing the gap.

V. What are the nitty-gritty details on how all this will work?
A. Roles: To implement this QEP plan, the following roles would be required.
1. Plank One - The Watch
   a. Director of The Watch. This person runs The Watch. Manages the PR for the watch, hires the student assistants, chooses topics with student help, heads a committee that chooses the longer-term Watch topics, chooses and implements assessment of The Watch, and writes annual reports on what has happened at The Watch. Interfaces with other relevant campus activities such as the Pendulum and University Relations.
   b. Student research assistants for The Watch, faculty and staff mentors.
2. Plank Two - Curriculum Infusion
   a. Directors of Information Literacy Campus Infusion. This two-person team runs the curriculum infusion and assessment. One of the directors should be a faculty member, and one should be from Belk Library. Working with a selection committee, will choose departments to receive grants each year. Will assist departments in selecting and implementing curricular innovations, and with integrating librarians into research partnerships. Will assist Library to enhance On-Demand training for students as needed. Will find and implement assessment of On-Demand training (for example, SAILS assessment [17] or similar).
   b. Library partners. Plank Two will allow librarians to help each department choose and implement the information literacy goals for that department.

B. Budget of the Plan: Removed by request.

C. Assessment Options
1. Learning Outcomes: As described in Section II of this proposal, the five ACRL standards include 22 performance indicators, each of which has dozens of defined
learning outcomes. The learning outcomes are really guidelines for developing local, specialized methods for measuring student learning. The guidelines specifically state that they are best used to “measuring student learning in the context of an institution’s unique mission”. These are the learning outcomes that will be applied to assess the success of the two Planks of this proposal.

2. **Assessing The Watch:** Under Plank One, The Watch is an innovative co-curricular activity with specific learning outcomes related to information literacy through its “Guidance”, “Investigation”, and longer-term “Special Projects” activities. It can be difficult (but not impossible) to measure the academic impact of a co-curricular activity. It will be the responsibility of the Director to create and maintain the specific annual learning goals for The Watch, to create and maintain an annual assessment plan (including implementing assessments, identifying gaps in learning, and disseminating results of assessments). Since The Watch is somewhat different than other information literacy activities proposed by other universities, there may be opportunities to publish academic papers (or do consulting activities) on the experience.

The ACRL learning outcomes should guide the assessment of the two products produced by The Watch: (a) the written products produced by the students working on The Watch and (b) the community responses to the written products generated by The Watch. For example, following the Wall St. Journal case introduced earlier: a Watch research student or team of students may craft a response article, which will be published, and then could easily be assessed against the ACRL information literacy outcomes. Then Professor X may encourage her class to gather additional data from a new source and send responses to the original article. These published responses can also be assessed. We anticipate that is a non-negligible amount of work and that this effort would not necessarily touch every student on campus. These are facts to know going in.

3. **Assessing Curricular Infusion:** Under Plank Two, we cast a wider net. Departments are given funding to develop their own plan for integrating and assessing information literacy in their departments or programs. The expectation is that these departments and programs will draw heavily on the learning outcomes as described in the ACRL guidelines, and will use their team of information literacy experts (their librarian partners) for ideas and guidance. The ACRL goes as far as to state explicitly “faculty and librarians should also work together to develop assessment instruments and strategies in the context of particular disciplines”. There is no one-size-fits-all since “information” is inherently context-driven. That said, to ensure some level of meaningful participation by all students, considerations may include: departments should attempt to reach a variety of students (e.g. not burying all information literacy outcomes in a single rarely-offered course), departments could attempt to incorporate a variety of lower-order and higher-order ACRL learning outcomes, for example library search (standard 2.2.d) is a lower-order skill, whereas reflection (standard 4.2.b) is a higher-order skill.

4. **Assessing Library Initiatives:** Choosing and implementing a standardized test (such as SAILS [17]) or a home-grown method for assessing student research skills is critical to understanding where the gaps are during this process.
5. **Other measures**: It will be interesting to monitor the faculty and student surveys (such as those shown in Section III) to identify trends or changes.

D. **Timeline of QEP**

Below we show a partial project chart of how this project might unfold. If this chart is difficult to read, we have placed an easier-to-read (and interactive) version at the following link: http://ow.ly/5NPnH. The online version shows Q1 2012 through Q2 2017.

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E. **Sustainability of QEP Plan**

By 2017 each department will have had an opportunity to integrate information literacy into their curricula and to assess that infusion. Ongoing assessment and upgrades to curricula will follow whatever the current university policies are at that time. The Watch will have had five years to refine and revise its research agenda, and, if successful, will have made a name for itself on campus and in the greater community as a place where interesting research happens. Because it will be the first research source of its kind for university students, it could potentially finance itself for a short time through sales of a research guide, similar to the way Spark Notes started as a student project at Harvard University, or through consulting fees. This will take some creative leadership. Longer-term financing arrangements could include a donation model. If The Watch fails, the five-year mark serves as a convenient stopping point.

VI. **What benefits will Elon University see from implementing this QEP?**

As a community, we are being encouraged to embark on a “green field” project - an open-ended adventure in which we devise our own plan to make ourselves better. Elon University is not the kind of place where we will choose something easy, or “take the QEP pass/fail”. We love doing fun new things. However, Elon has many new initiatives going on. We want to balance the desire to do cool things with the realities of a 24-hour day.

So, we want to mention that in many ways our plan is also compatible with other QEP topic proposals - especially with Writing, Intellectual Engagement, and Civic Engagement. Students who work on a project for the The Watch will certainly find themselves writing in many different ways: compiling data, summarizing findings, interviewing community groups, writing press releases, questioning blog postings, explaining methods, requesting funding, writing their own articles and research papers. Because the questions are both legitimate and difficult, students will be engaged intellectually as never before, and they will be tackling issues that matter.
This plan is also flexible, and respectful of differences in departmental priorities. Our plan embraces many disciplines, many ways of teaching, many ways of learning, many schedules, many professional objectives. It is not a one-size-fits-all model. It acknowledges the differences in our students, our faculty, our programs, and our schools, while uniting us around a goal of being intellectually ready for life in the 21st century - and having fun while doing it. Our plan is centered on student engagement, but it is also standards- and outcomes-based.

What will be the benefits to the students? Our original hypothetical question asked how a student graduating in May of 2011 may have responded to the original graph and article from the Wall St. Journal, and our contention was that students have room for improvement in this area. In 2017, after enacting this plan, we would expect a few likely student impacts.

Students who had worked on The Watch would attack this example with gusto. These student researchers would be immediately skeptical of anything presented in graphical form. They would be fascinated that the article in question is from a mainstream news source, yet has such obvious problems in its presentation of data and the conclusions drawn from it. These students will be used to asking (and answering) complex questions in a respectful and thoughtful way, using data.

Even if a student has not worked on a Watch project directly, following the curriculum infusion described in Plank Two, all students should have been exposed to courses designed to meet information literacy standards. These students will likely have a range of responses to the article presented earlier, but at the very least they should be able to ask basic questions about the source of a document and data, and the motivations of the author. As part of President Obama’s “informed and educated citizenry”, they will be able to ask and answer tough questions.

Finally, prospective students will be impressed by the positive energy surrounding research on our campus. Imagine a student tour guide walking through Belk Library: “And over there is The Watch office. The Watch is a student group that researches current events. One thing they did just last month was that they uncovered misstatements made in some news articles about the budget crisis. Politifact picked up their findings and the work was covered in the Washington Post. A lot of your courses will emphasize this kind of research. Being able to answer hard questions using facts and data is an important skill, and we really work on that a lot at Elon.”

This QEP plan is ambitious, audacious, and perhaps slightly crazy. It will cost a lot of money and it requires some really high-quality work by students and some strong leadership from new coalitions of faculty and staff. It is also novel, exciting, energetic, and academically engaged – all the things that Elon tries to be already. We have enjoyed putting these ideas together and look forward to discussing all the QEP proposals in the coming weeks and months.
Data Listings

2010 NSSE Data for Elon University (partial)

Listing 1:
During the current school year, how much has your coursework emphasized *synthesizing and organizing ideas, information, or experiences*? (% answering ‘quite a bit’ or ‘very much’)

- First years 81%
- Seniors 85%

Listing 2 (also related to Listing 10):
During the current school year, how much has your coursework emphasized *making judgments about the value of information, arguments, or methods* (% answering ‘quite a bit’ or ‘very much’)

- First years 76%
- Seniors 79%

Listing 3 (also related: Listing 7)
To what extent has your experience at this institution contributed to your knowledge, skills, and personal development in *thinking critically and analytically*? (% answering ‘quite a bit’ or ‘very much’)

- First years 90%
- Seniors 94%

Listing 4 (also related to Listings 8 and 9):
Used an *electronic medium* to discuss or complete an assignment (% answering ‘often’ or ‘very often’)

- First years 62%
- Seniors 62%

Listing 5 (also related to Listing 13):
Worked on a paper or project that required *integrating ideas or information from various sources* (% answering ‘often’ or ‘very often’)

- Incoming First-Years Expecting to do: 97% (BCSSE data 2009)
- First years 92%
- Seniors 94%

2010 YFCY (“Your First College Year”) Data for Elon University (partial)

Listing 6:
Compared with when you entered this college, how would you now describe your *ability to conduct research*? (n=593)
‘Stronger’ or ‘Much stronger’ 64%
‘No change’ 35%
‘Weaker’ or ‘Much weaker’ 1%

Listing 7 (also related: Listing 3)
Compared with when you entered this college, how would you now describe your **critical thinking skills**? (n=594)

‘Stronger’ or ‘Much stronger’ 70%
‘No change’ 29%
‘Weaker’ or ‘Much weaker’ 1%

Listing 8 (also related: Listings 4 and 9)
For the activities below, indicate which ones you did during the past year. (In other words, their first college year)

**Used the Internet for research or homework** (n=584)
Frequently 91%
Occasionally 9%
Not at all 0.0%

**2010 CIRP Incoming Freshman Data for Elon University (partial)**

Listing 9 (also related to Listings 4 and 8):
For the activities below, indicate which ones you did during the past year. (In other words, their high school year)

**Used the Internet for research or homework** (n=1221)
Frequently 90%
Occasionally 10%
Not at all 0.0%

Listing 10 (also related to Listing 2):
How often in the past year did you **evaluate the quality or reliability of information** you received? (n=1202)

Frequently 40%
Occasionally 55%
Not at all 5%

Listing 11:
How often in the past year did you **look up scientific research articles and resources** (n=1198)

Frequently 21%
Occasionally 57%
Not at all 22%
Listing 12:
How often in the past year did you *explore topics on your own*, even though it is not required for a class (n=1197)

- Frequently 27%
- Occasionally 59%
- Not at all 14%

Listing 13 (also related to Listing 5):
How often in the past year did you *integrate skills and knowledge from different sources* and experiences (n=1200)

- Frequently 63%
- Occasionally 37%
- Not at all 0%
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